

Amendment
U.S. Patent Application Serial No. 10/602,019

IN THE CLAIMS:

Please cancel claims 43 - 58 and 66 - 81 without prejudice or disclaimer of the subject matter thereof and amend the claims as follows.

--1 - 35 (Canceled).

36 (Currently amended). A firearm laser training system enabling a user to project a laser beam toward a target to simulate firearm operation comprising:

 a sensing device to scan said target to produce scanned images of said target including impact locations of said laser beam on said target; and

 a processor to process said scanned images including said impact locations, wherein said processor includes:

 a density module to determine pixel density values for pixels within said scanned images, wherein said pixel density value for a scanned image pixel is determined by combining component pixel values for that pixel; [[and]]

 a detection module to identify said impact locations within said scanned images based on said pixel density values of pixels within said scanned images exceeding a threshold; and

a threshold module to automatically adjust said threshold in response to measured light conditions of a surrounding environment.

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37 (Previously presented). The system of claim 36, wherein said component pixel values for each pixel within said scanned images include values associated with Red (R), Green (G) and Blue (B) pixel components, and said pixel density value for that pixel is determined by:

Pixel Density = (Red value x Weight1) + (Green value x Weight2) + (Blue value x Weight3);

wherein Weight1, Weight2 and Weight3 are weighting values.

38 (Previously presented). The system of claim 36, wherein said detection module includes a group location module to compare pixel density values of scanned image pixels to said threshold to identify a group of pixels within a scanned image where each group member pixel includes a pixel density value exceeding said threshold.

39 (Previously presented). The system of claim 38, wherein said detection module further includes an impact location module to determine the scanned image pixel positioned at a center of said group and representing said impact location.

40 (Previously presented). The system of claim 39, wherein said detection module further includes a coordinate module to determine coordinates of said pixel representing said impact location.

41 (Previously presented). The system of claim 36, wherein said target includes a

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plurality of zones each representing an intended target site and associated with a score value, and said processor further includes:

a scoring module to determine impact scores, wherein each impact score is associated with a detected impact location and based on said score value of said zone containing that detected impact location.

42 (Previously presented). The system of claim 36 further including a display to display an image of said target with indicia indicating said detected impact locations.

43 – 58 (Canceled).

59 (Currently amended). In a firearm simulation system enabling a user to project a laser beam toward a target and including a sensing device and a processor, a method of simulating firearm operation comprising:

(a) scanning said target with said sensing device to produce scanned images of said target including impact locations of said laser beam on said target; and

(b) processing said scanned images including said impact locations via said processor, wherein said processing includes:

(b.1) determining pixel density values for pixels within said scanned images, wherein said pixel density value for a scanned image pixel is determined by combining component pixel values for that pixel; [[and]]

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(b.2) identifying said impact locations within said scanned images based on said pixel density values of pixels within said scanned images exceeding a threshold; and

(b.3) automatically adjusting said threshold in response to measured light conditions of a surrounding environment.

60 (Previously presented). The method of claim 59, wherein said component pixel values for each pixel within said scanned images include values associated with Red (R), Green (G) and Blue (B) pixel components, and step (b.1) further includes:

(b.1.1) determining said pixel density value for a scanned image pixel in accordance with:

Pixel Density = (Red value x Weight1) + (Green value x Weight2) + (Blue value x Weight3);

wherein Weight1, Weight2 and Weight3 are weighting values.

61 (Previously presented). The method of claim 59, wherein step (b.2) further includes:

(b.2.1) comparing pixel density values of scanned image pixels to said threshold to identify a group of pixels within a scanned image where each group member pixel includes a pixel density value exceeding said threshold.

62 (Previously presented). The method of claim 61, wherein step (b.2) further

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includes:

(b.2.2) determining the scanned image pixel positioned at a center of said group and representing said impact location.

63 (Previously presented). The method of claim 62, wherein step (b.2) further includes:

(b.2.3) determining coordinates of said pixel representing said impact location.

64 (Previously presented). The method of claim 59, wherein said target includes a plurality of zones each representing an intended target site and associated with a score value, and step (b.2) further includes:

(b.2.1) determining impact scores, wherein each impact score is associated with a detected impact location and based on said score value of said zone containing that detected impact location.

65 (Previously presented). The method of claim 59 further including:

(c) displaying an image of said target with indicia indicating said detected impact locations on a display.

66 – 81 (Canceled).

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82 (New). A firearm laser training system enabling a user to project a laser beam toward a target to simulate firearm operation comprising:

a sensing device to scan said target to produce scanned images of said target including impact locations of said laser beam on said target; and

a processor to process said scanned images including said impact locations, wherein said processor includes:

a density module to determine pixel density values for pixels within said scanned images, wherein said pixel density value for a scanned image pixel is determined by combining component pixel values for that pixel, and wherein said component pixel values for each pixel within said scanned images include values associated with Red (R), Green (G) and Blue (B) pixel components, and said pixel density value for that pixel is determined by:

$$\text{Pixel Density} = (\text{Red value} \times \text{Weight1}) + (\text{Green value} \times \text{Weight2}) + (\text{Blue value} \times \text{Weight3}),$$
 wherein Weight1, Weight2 and Weight3 are weighting values; and

a detection module to identify said impact locations within said scanned images based on said pixel density values of pixels within said scanned images exceeding a threshold.

83 (New). The system of claim 82, wherein said detection module includes a group location module to compare pixel density values of scanned image pixels to said threshold to identify a group of pixels within a scanned image where each group member pixel includes a pixel density value exceeding said threshold.

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84 (New). The system of claim 83, wherein said detection module further includes an impact location module to determine the scanned image pixel positioned at a center of said group and representing said impact location.

85 (New). The system of claim 84, wherein said detection module further includes a coordinate module to determine coordinates of said pixel representing said impact location.

86 (New). The system of claim 82, wherein said target includes a plurality of zones each representing an intended target site and associated with a score value, and said processor further includes:

a scoring module to determine impact scores, wherein each impact score is associated with a detected impact location and based on said score value of said zone containing that detected impact location.

87 (New). The system of claim 82 further including a display to display an image of said target with indicia indicating said detected impact locations.

88 (New). The system of claim 82, wherein said processor further includes:
a threshold module to automatically adjust said threshold in response to measured light conditions of a surrounding environment.

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89 (New). In a firearm simulation system enabling a user to project a laser beam toward a target and including a sensing device and a processor, a method of simulating firearm operation comprising:

(a) scanning said target with said sensing device to produce scanned images of said target including impact locations of said laser beam on said target; and

(b) processing said scanned images including said impact locations via said processor, wherein said processing includes:

(b.1) determining pixel density values for pixels within said scanned images, wherein said pixel density value for a scanned image pixel is determined by combining component pixel values for that pixel, and wherein said component pixel values for each pixel within said scanned images include values associated with Red (R), Green (G) and Blue (B) pixel components, and step (b.1) further includes:

(b.1.1) determining said pixel density value for a scanned image pixel in accordance with:

$$\text{Pixel Density} = (\text{Red value} \times \text{Weight1}) + (\text{Green value} \times \text{Weight2})$$

+ (Blue value x Weight3), wherein Weight1, Weight2 and Weight3 are weighting values; and

(b.2) identifying said impact locations within said scanned images based on said pixel density values of pixels within said scanned images exceeding a threshold.

90 (New). The method of claim 89, wherein step (b.2) further includes:

(b.2.1) comparing pixel density values of scanned image pixels to said threshold to

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identify a group of pixels within a scanned image where each group member pixel includes a pixel density value exceeding said threshold.

91 (New). The method of claim 90, wherein step (b.2) further includes:

(b.2.2) determining the scanned image pixel positioned at a center of said group and representing said impact location.

92 (New). The method of claim 91, wherein step (b.2) further includes:

(b.2.3) determining coordinates of said pixel representing said impact location.

93 (New). The method of claim 89, wherein said target includes a plurality of zones each representing an intended target site and associated with a score value, and step (b.2) further includes:

(b.2.1) determining impact scores, wherein each impact score is associated with a detected impact location and based on said score value of said zone containing that detected impact location.

94 (New). The method of claim 89 further including:

(c) displaying an image of said target with indicia indicating said detected impact locations on a display.

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95 (New). The method of claim 89, wherein step (b) further includes:

(b.3) automatically adjusting said threshold in response to measured light conditions of a surrounding environment.--